

Open Research Online

The Open University's repository of research publications and other research outputs

Taxing Cars With Attitude

Conference or Workshop Item

How to cite:

Lane, Ben; Potter, Stephen and Warren, James (2006). Taxing Cars With Attitude. In: Low CVP Low Carbon Road Transport Challenge, Low Carbon Vehicle Partnership (Low CVP) Annual Conference 2006, Low Carbon Vehicle Partnership, Harps Ltd, Essex, UK, pp. 41–47.

For guidance on citations see [FAQs](#).

© 2006 The Authors



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Version: Version of Record

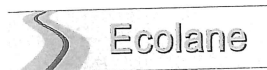
Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Paper 6



The Open University



Taxing cars with attitude

Dr Ben Lane

Director, Ecolane Transport Consultancy/Open University

Prof Stephen Potter

Professor of Transport Strategy, Technology Faculty, The Open University

Dr James Warren

Technology Faculty, The Open University

It is now becoming clear that the ACEA CO₂ voluntary agreement for a reduction to 140g/km for 2008/9 is unlikely to be met.¹ Furthermore, delivering the target of 120g/km by 2012 now looks improbable. Although pressure for mandatory regulation grows, for a limited time there remains an opportunity to increase the effectiveness of existing consumer price signals to encourage the uptake of low carbon cars.

This submission proposes a new approach to designing an effective low carbon taxation regime. This is to start by identifying the most accessible attitudinal levers with which to modify consumer behaviour. This achieved, a taxation system is then devised to influence attitudes and behaviour to maximum effect. In this way, the attitude-action gap is bridged, exploiting the most efficient links between tax policy, consumer attitudes, car purchasing behaviour and carbon impact.

¹ European car CO₂ emissions fall in 2005, but 2008 target out of reach says T&E. LowCVP online news, April 2006.

² Potter, S, Parkhurst G, Lane, B. European perspectives on a new fiscal framework for transport. In Reggiani, A and Schintler, L (Eds): *Methods and Models in Transport and Telecommunications: Cross Atlantic Perspectives*. Springer, Berlin and New York, 2005.

³ Although company car tax reform has influenced vehicle choice, it has produced a shift to diesel cars rather than secure the adoption of more significant low carbon technologies.

⁴ *Taxation Futures for Sustainable Mobility*. Open University (UK) and Free University (Netherlands). ESRC Environment and Human Behaviour Programme, 2004.

Deficiencies and opportunities of current private car taxation

Despite some evidence that the eco-reforms to car taxation have promoted a degree of useful change, the effects to date have been relatively marginal. The reason appears to be the deeply entrenched fact that the market simply does not view fuel economy or low environmental impact cars as an important issue.² In particular, engine design and other fuel efficiency improvements have been used mainly to improve the performance of cars rather than their fuel economy.

Research at the Open University also highlights the ongoing failure of car taxes to sufficiently influence consumer behaviour and notes that UK vehicle taxation is concentrated on fuel duties, there being no specific purchase tax (unlike in much of the EU) and that circulation tax (vehicle excise duty (VED)) is relatively low. Thus, taxation tends to more strongly affect vehicle use than vehicle choice.³ It also identifies future problems that may result from introducing more low carbon vehicles – namely, the potential loss in revenues to HMT due to fuel excise duty (FED) discounts and the 'rebound' effect that may increase total vehicle miles as a result of lower fuel costs.⁴ The need for a radical restructuring in private car taxation is also underlined by the difficulties of taxing fuel in a future multi-fuel transport sector and the equity issues of taxing fuel at different rates in different sectors.

5 Consumer attitudes to low-carbon and fuel-efficient passenger cars. Low Carbon Vehicle Partnership, 2005.

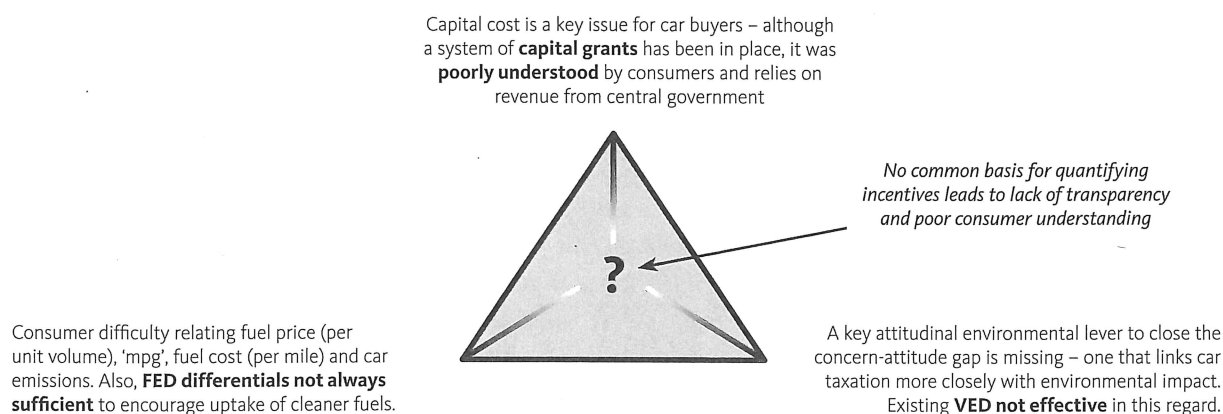
6 Assessing the Impact of Graduated Vehicle Excise Duty. Department for Transport, March 2004.

The factors that influence car purchasing decisions further highlight these issues. Research conducted by Ecolane for the LowCVP⁵ identifies a two-stage (private) car-buying process. First, purchase price and performance largely determine which models are to be considered. This is followed by a more sophisticated assessment of running costs (including 'mpg'), performance, safety, styling, brand and reliability. 'Environment', 'vehicle emissions', 'alternative fuels' and 'road tax' (VED) are the least important factors for most consumers during car purchase. Although many consumers correctly correlate average fuel economy with vehicle class, most are largely unaware of the large variation of 'mpg' within each segment.

The findings explain why, for the private sector, existing incentives have failed to deliver the required shift to a low carbon fleet. Although VED is graduated to reflect the level of CO₂ emissions, this incentive alone is not a sufficient driver to switch to lower CO₂ cars.⁶ Not only is this (in part) due to the fact that VED rates are not well understood by drivers, it is also that the banding differentials are too small to have a significant impact on car purchasing behaviour – even at the latest 2006 rates. Whereas the current difference between adjacent VED bands ranges from £20 to £60, the Department for Transport estimate that band differentials would have to be at least £150 for over half of consumers to take account of this price signal. It is only where local incentives are significantly greater (such as in London where Congestion Charge discounts apply for cleaner vehicles) has there been a significant uptake of low carbon/cleaner cars. Furthermore, existing measures have failed to raise the importance of vehicle emissions either at the point of purchase or throughout the period of vehicle ownership.

Excluding performance and branding issues, the LowCVP study identifies deficiencies concerning three key factors that are open to national interventions to increase the uptake of low carbon cars – see Figure 1.

Figure 1 Deficiencies of the three main attitudinal levers



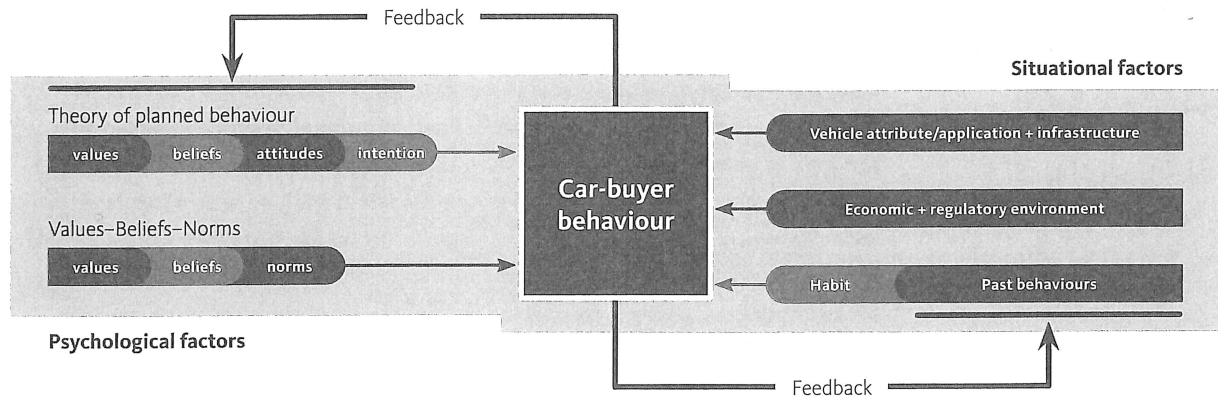
- 7 Choo S. and P.L. Mokhtarian. What type of vehicle do people drive? The role of attitude and lifestyle in influencing vehicle type choice. *Transportation Research A* 2004;38:201–222.
- 8 Ajzen, I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 1991;50:179–211.
- 9 Kurani, K. S. & Turrentine, T. S. Marketing Clean and Efficient Vehicles: A Review of Social Marketing and Social Science Approaches. UCSD-ITS-RR-02-01. Institute of Transportation Studies, University of California, Davis, 2002.
- 10 Bamberg S. and P. Schmidt. Incentives Morality, or habit? Predicting students' car use for university routes with models of Ajzen, Schwartz, and Triandis. *Environment and Behaviour*, 2003;35(2):264–285.

Psychological aspects of car purchase

In addition to the objective situational factors (economic/regulatory environment, vehicle performance/application, existing fuel/road infrastructure), more subjective psychological factors influence car purchasing behaviour. These include: attitudes, lifestyle, personality and image.⁷ What makes these psychological factors of particular interest is that, not only do they influence behaviour directly, they also mediate the more 'objective' situational issues. For example, it is how consumers perceive the economic environment that influences their purchasing behaviour rather than the actual costs. Therefore, to more fully understand the importance of the factors influencing consumer behaviour, it is instructive to place these factors within social-psychological models.

The most well known (though incomplete) model is Ajzen's Theory of Planned Behaviour (TPB) that attempts to explain the causal link between values, beliefs, attitudes, intentions and behaviour.⁸ In simple terms, the theory proposes that when given a behavioural choice, an individual will consider the alternatives and assess their consequences based on their beliefs relating to the actions and their effects. These beliefs determine an individual's attitudes regarding the possible actions, which in turn influence the intention to act – behavioural intention being a strong indicator of the actual behaviour chosen (see Figure 2).⁹

Figure 2 Factors influencing car-buyer behaviour



Central to the Theory of Planned Behaviour are behavioural beliefs (related to the consequences of certain actions), normative beliefs (perceived expectations of others) and control beliefs (the actions/effects that an individual believes can be enacted/influenced). These beliefs are strongly influenced by a person's values and are dependent to some degree on the information available to the individual. The central point of the TPB is that it proposes that actions are selected on the basis of a reasoned consideration of the alternatives whereby the optimum outcome is achieved – in essence, the theory "views the individual as a utility-maximising actor".¹⁰

- 11 Anable, J. 'Complacent Car Addicts' or 'Aspiring Environmentalists'? Identifying travel behaviour segments using attitude theory. *Transport Policy* 2005;12:65-78.
- 12 Comparative colour-coded labels for passenger cars. London: Department for Transport, October 2003.
- 13 Consumer acceptance of new fuels and vehicle technologies. Cambridge MBA students' study conducted on behalf of Shell. UK Presentation to the Low Carbon Vehicle Partnership, 2004.
- 14 RAC Report on Motoring, 2004.
- 15 D. Walton, J.A. Thomas, V. Dravitzki. Commuters' concern for the environment and knowledge of the effects of vehicle emissions. *Transportation Research Part D* 2004;9:335-340.
- 16 Collins, J., G. Thomas, R. Willis, J. Wilson. Carrots, Sticks and Sermons: Influencing Public Behaviour for Environmental Goals. Demos and DEFRA, 2003.
- 17 To reduce cognitive dissonance, a person may change their opinions and/or behaviour, or may distort their perceptions and/or information received about the world.

Although beyond the scope of this paper, many other factors have also been proposed that influence behaviour. One particularly important factor relevant to the study of consumer choice is habitual behaviour whereby new actions are "*instigated without the mediation of attitudes or intentions*".¹¹ Although this can be explained by the TPB (past actions informing attitudes and personal norms), there is much evidence that habits alone are a strong predictor of future behaviour.

Influencing as it does values, beliefs, and norms, knowledge (in particular of the environment) is also identified as an important factor in understanding (the intention for) pro-environmental consumer choice. However, the issue here is that consumers often lack a detailed understanding about environmental issues (such as the causes of climate change) and the impact of transport on the environment. A particular issue investigated by a number of studies is car buyers' understanding of the link between fuel economy and emissions of carbon dioxide. One DfT report notes that: "*the relationship between inputs (fuel) and outputs (emissions) is only very generally – if at all – understood by most drivers*".¹² There is also evidence that consumers have a very low knowledge-base regarding low carbon and fuel-efficient vehicles and that stable (mostly negative) misconceptions are present at all levels (eg 'hybrid electric cars have limited range').¹³ To make matters worse, consumer awareness/knowledge regarding car ownership costs is very low as illustrated by the fact that motorists underestimate car costs by around a factor of two.¹⁴

Within the psychological-situational framework that lies at the foundation of consumer decisions, three issues relevant to the adoption of low carbon and fuel-efficient cars are now highlighted. First, attitudinal research suggests that the level of environmental concern and knowledge held by commuters does not determine their vehicle choice and *drivers are just as likely to be very concerned for the environment even if they drive a highly polluting vehicle*.¹⁵ In other words, for the general population, the concern and knowledge are not the determining factors for using or purchasing a cleaner car. Therefore, (further) increasing concern through the provision of more information will not necessarily lead to a change in consumer behaviour. This case is supported by Collins *et al* who conclude that, done in isolation, providing information (to increase awareness and concern) is rarely effective in producing behavioural change. Other parallel policies are required such as the use of economic incentives.¹⁶

The second issue is the theory of *cognitive dissonance* in relation to automotive marketing. Cognitive dissonance centres around the idea that if a person knows various things that are not psychologically consistent with one another s/he will, in a variety of ways, try to make them more consistent.¹⁷ Based on this, one approach to marketing clean and efficient vehicles is to explore the desire for a cleaner environment among users of a polluting, inefficient technology – in essence to capitalise on the high levels of environmental concern, and assist purchasers translate this to consumer action.

- ¹⁸ Kurani, K. S. & Turrentine, T. S. Marketing Clean and Efficient Vehicles: A Review of Social Marketing and Social Science Approaches. UCD-ITS-RR-02-01. Institute of Transportation Studies, University of California, Davis, 2002.

Interestingly, car purchases also produce significant *post-purchase* cognitive dissonance. In their examination of automobile purchasing, Ehrlich *et al* revealed two sources of dissonance.¹⁸ One source concerns the superior features of any competing model that was considered for purchase, but not purchased; the other concerns the poorer features of the purchased model. Both of these sets of features are dissonant with ownership of the purchased car. They hypothesized, and found, that recent purchasers of a particular vehicle are more likely to read product advertisements for that car than people who had recently purchased some other model (or none). In effect they found that, in addition to any role in prompting people to buy a particular model, another role of advertising is to make people who have already purchased a car feel better about their purchase.

The third, and perhaps surprising, suggestion from consumer research is that some consumers may not make purchase decisions at all. If it is accepted that the decision process must involve a stage in which *“evaluative criteria facilitate the forecasting of each alternative’s consequences for the consumer’s goals or objectives”*¹⁸ then, in situations where the comparative evaluation of options is highly complex (or even unknown), the purchasing process cannot follow a rational path. Given that car ownership involves an interlocking set of products and services (eg vehicle, fuel, tax, insurance, maintenance, repair, garaging, parking etc), even the most dedicated car buyer can only estimate with varying accuracy the cost (quantity and price) and quality of all of these factors. Hence, faced with such a difficult (non-transparent) decision, the consumer is likely to default to a habitual or unconscious behaviour.

Towards a new private car taxation system

In the light of the failure of the existing system of private vehicle taxation to stimulate the adoption of low carbon and fuel efficient cars, this submission proposes that far more attention should be given to the psychological responses of consumers to environmental issues and economic signals. In particular this should be achieved as follows:

1. Given that the over-riding factors involved in car purchasing decisions are centred on costs and vehicle performance, with very little weight being given to environmental factors, car ownership costs should be more closely aligned with environmental performance to ‘externalise’ the level of environmental impacts.
2. As knowledge is necessary but not sufficient to promote pro-environmental consumer behaviour, information programmes such as the new car label should be continued and expanded, but should be backed up by effective, consistent and significant price signals throughout the duration of car ownership.
3. Although environmental knowledge is low, environmental concern is very high. To capitalise on this existing public engagement – and to reduce cognitive dissonance before and after car purchase – the links between

19 Taxation Futures for Sustainable Mobility. Open University (UK) and Free University (Netherlands), 2004.

20 Road User Fee Task Force. Oregon Department of Transport, 2003. URL: <http://www.odot.state.or.us/rufft/>.

21 Consumer attitudes to low-carbon and fuel-efficient passenger cars. The Low Carbon Vehicle Partnership, 2005.

car ownership costs and environmental impacts need to be made explicit, transparent and maintained throughout car ownership. Therefore, car purchase and car use incentives should be simple to understand and clearly linked.

4. Given the experience of the Energy Saving Trust, capital incentives are essential and effective (though costly) in stimulating markets for cleaner vehicles in cases where higher capital costs act as an adoption barrier. In the long term, self-financing systems will be required to ensure the market competitiveness of low carbon cars. One such system is a fiscally-neutral purchase 'feebate' scheme – 'fees' being charged on the highest emitting cars (according to CO₂ emissions) to provide 'rebates' for low carbon vehicles.
5. Existing VED rates are ineffective, and the link between rates and CO₂ emissions poorly understood. Furthermore, consumers have difficulty relating fuel price (per unit volume), fuel economy ('mpg') and fuel cost (per mile). Therefore VED should be replaced by a new Pay-As-You-Drive (PAYD) charge based on vehicle CO₂ emissions (and application). This would continue to use the CO₂ banding introduced for VED, but the bands would be widened and the amounts payable increased (in line with a reduction in FED revenue). The effect would be to more closely align vehicle choice and ongoing vehicle 'cost experience' in the mind of the consumer, and increase the importance attributed to CO₂ and fuel economy, factors whose importance is not currently appreciated by private motorists.

Initial modelling conducted by the Open University and others suggests that, using a CO₂ banded car distance charge of 3.3–10.4 p/km, total CO₂ emissions would reduce by up to 6% as compared to a base scenario while at the same time generating an additional £3 billion per annum.¹⁹ As occurs in Oregon, the charge could be implemented using an 'opt-in' approach whereby the charge is made at filling stations where, if an on-board (low cost) transponder unit is detected, fuel tax is substituted by a distance charge.²⁰ If successful, such a system would prepare UK motorists for a national congestion charge.

6. To gauge the scale of incentives that are required to stimulate consumer behavioural change, empirical evidence should be used. For example, although car buyers say costs are paramount in their decision-making, it turns out that they are prepared to endure large increases in costs before changing their behaviour; annual costs have to increase by at least £1,100 before drivers will consider switching to an alternative fuel, smaller engine, or smaller car.²¹ Therefore, the total 'cost experience' differentials between low carbon and highly polluting cars should be at least the equivalent of £1,100 per annum.

7. A further step is also required to address the concern-action gap regarding vehicle emissions and the cognitive dissonance of motorists. This proposal is to hypothecate a proportion of the new PAYD revenue stream to offset and/or sequestrate carbon emissions from the road sector. This would (a) reduce road generated CO₂ emissions over a very short timescale from a sector that is seen as particularly problematic regarding climate change; and (b) increase user/consumer acceptance of a new private car taxation system based on distance. In essence, motorists would be offered a choice of driving low carbon cars at lower cost or high carbon vehicles and (in part) paying to offset their higher carbon emissions.
8. Lastly, to aid understanding and increase user acceptance, the method for calculating the magnitude of incentives offered by feebates, a PAYD charge and remaining FED should be harmonised. Given the recent introduction of the new car label, all taxation streams should be scaled according to the colour coded A–G CO₂ bands, a system already well accepted by consumers in other sectors – see Figure 3.

Figure 3 Car taxation system aligned to user attitudes

